COBB COUNTY
DEPARTMENT OF TRANSPORTATION
ENGINEERING DIVISION

Floyd Road Widening/Floyd Road Sidewalks
Project No. D12C0
GDOT No. CSMSL-0007-00(132), P.I. No. 0007132
GDOT No. CM-0004-00(510), P.I. No. 0004510
March 14, 2012

ADDENDUM NO. 1

Proposals Received Until March 22, 2011 – 12:00 Noon Local Time

The following addendum hereby amends and/or modifies the Bid Documents and Contract Specifications as issued for this project. All bidders are subject to the provisions of this Addendum. **Bidders shall acknowledge receipt of this addendum and must use the attached revised bid schedule of items stamped Addendum No. 1.**

*Addenda, including plan holder lists, will be posted online at the following websites for Cobb Purchasing and Cobb DOT: http://purchasing.cobbcountyga.gov/bid-list.htm and http://dot.cobbcountyga.gov/bid-rfp.htm . Receipt of addenda must be acknowledged in the bid document. It is the bidder's ultimate responsibility to ensure that they have all **applicable addenda prior to bid submittal** and to utilize the latest bid schedule.*

Proposals may be rejected if any of the Unit Prices are obviously unbalanced. The County will decide whether any Unit Prices are unbalanced either excessively above or below a reasonable cost analysis value determined by the Engineer, particularly if these unbalanced amounts are substantial and contrary to the interest on the County.

School Zone Flashers must be maintained during construction.

Contractor must maintain pedestrian access and pedestrian signals at all times during construction. Please see note on sheet 13-08. Contractor will use manufactured sand.

I. PREBID CONFERENCE

Minutes of the Prebid Conference held on Tuesday March 13, 2012, are attached.

II. BID SCHEDULE OF ITEMS

ADDED:

Group: SW1 SIDEWALK

Pay Item #500-9999, Class B Concrete, Base or PVMT Widening, **400 CY**
Pay Item #550-1180, Storm Drain Pipe, 18 IN, H 1-10, **2,660 LF**
Pay Item #550-1240, Storm Drain Pipe, 24 IN, H 1-10, **640 LF**
Pay Item #550-1300, Storm Drain Pipe, 30 IN, H 1-10, **30 LF**
Pay Item #550-1360, Storm Drain Pipe, 36 IN, H 1-10, **430 LF**
Pay Item #611-4001, Reconstruct Minor Drainage Structure, **1 EA**
Pay Item #668-1100, Catch Basin, GP 1, **25 EA**
Pay Item #668-1110, Catch Basin, GP 1, Addl Depth, **12.00 LF**

II. BID SCHEDULE OF ITEMS (continued)

REVISED:

Group: SWI SIDEWALK

Pay Item #500-3201, Class B Concrete, Retaining Wall, **170 CY**

DELETED:

Group: TO1 ROADWAY

Pay Item #550-1300, Storm Drain Pipe, 30 IN, H 1-10, **0 LF**
Pay Item #550-1360, Storm Drain Pipe, 36 IN, H 1-10, **0 LF**

REVISED:

Group: T01 ROADWAY

Pay Item #500-3201, Class B Concrete, Retaining Wall, **58 CY**
Pay Item #500-9999, Class B Concrete, Base or PVMT Widening, **600 CY**
Pay Item #550-1180, Storm Drain Pipe, 18 IN, H 1-10, **2,490 LF**
Pay Item #550-1240, Storm Drain Pipe, 24 IN, H 1-10, **200 LF**
Pay Item #611-4001, Reconstruct Minor Drainage Structure, **6 EA**
Pay Item #668-1100, Catch Basin, GP 1, **42 EA**
Pay Item #668-1110, Catch Basin, GP 1, Addl Depth, **7.00 LF**

III. QUESTIONS/ANSWERS

Q. In the bid proposal you have a pay item for message boards, will these message boards become the property of Cobb County when the project is finished or will they remain the Contractors property?

A. The message boards (large) will become property of Cobb County at the completion of the project. The message boards shall be refurbished before delivery. Please see attached specifications for the boards.

Q. Do all side streets require full depth construction?

A. Landers Drive is the only side road that is being cut thus needing to be full depth reconstruction. Barnes and Joseph Club is approx. 1.4-ft. above existing and Vernon is 1.7-ft. above existing therefore, will not need to be closed and can be constructed with leveling.

Questions should be sent via email, no later than 2:00 p.m. on Monday, March 19, 2012, **to** purchasing@cobbcounty.org

Michael S. Cates, P.E.
Pre-Construction Engineer

MSC/RJG/jan
cc: *Electronic copies:*
John Flood, Cobb County Purchasing (w/hard copy)
Bob Galante, CCDOT Construction
Ted Harris, CCDOT Operations
Russell Cooke, CCWS
James Hudgins, CCDOT Engineering
Wade Kelly, CCDOT Construction
Joe Alexander, CCDOT Construction
Jeff Neiswender, CCDOT Construction
Andy Rikard, CCDOT Utility Coordinator, Engineering
Kim Mergen, CCDOT Construction Division
Lynn Lambert, CCDOT Engineering Division
David Muller, CCDOT Utility Coordinator, Construction
Attachment: Prebid Minutes, Revised Bid Schedule & Message Board Specification

Floyd Road Widening/Floyd Road Sidewalks
Project No. D12C0
GDOT No. CSMSL-0007-00(132), P.I. No. 0007132
GDOT No. CM-0004-00(510), P.I. No. 0004510
PREBID CONFERENCE
Bid Date: March 22, 2012 – 12:00 Noon Local Time

DATE: March 13, 2012

ATTENDEES: See Attached Sign-in Sheet

MEETING MINUTES:

(1) This is the Prebid Conference for Cobb DOT **PROJECT NO. D12C0, Floyd Road Widening/Floyd Road Sidewalks. Bids will be received until 12:00 noon on March 22, 2012, at Cobb County Purchasing Department, 1772 County Services Parkway, Marietta, Georgia. Bids will be opened and read aloud at 2:00 p.m. at the Cobb County Purchasing Department, 1772 County Services Parkway.**

NO BIDS WILL BE ACCEPTED AFTER THE 12:00 NOON DEADLINE. Those received late will be unopened.

DO NOT DELIVER BIDS TO COBB DEPARTMENT OF TRANSPORTATION.

The Work must be complete within 540 consecutive calendar days from the Notice to Proceed date or the date Work begins, whichever comes first. All work on school property will be done during school vacation periods. School cannot be unfenced while school is in session.

Minutes of this meeting and any revisions will be issued as Addendum No. 1.

(2) **Introduction of Special Representatives in attendance.**

(3) **Project Description:**

Project consists of operational improvements to Floyd Road, from Clay Road to Hicks Road. Project also includes the addition of a 10' sidewalk on the west side of the roadway with a 5' grass strip between the sidewalk and the back of curb and a 5' sidewalk on the east side with a 2' grass strip.

Payment will be made monthly based on approved invoices.

Cobb County Water System work is involved on this project. Only contractors or sub-contractors who have been prequalified with Cobb County Water System are allowed to perform water and sewer relocation work associated with this project. Bidders or their water/sewer subcontractor are required to have a State of Georgia Utility Contractor License.

(4) **Bid Proposal and Contract Documents:**

Project is funded by Federal, State and/or local funds. Accordingly, the successful bidder will be required to comply with all applicable Federal and State rules and regulations, as well as those of Cobb County. Project must conform to all Americans with Disabilities Act (ADA) regulations.

A Disadvantaged Business Enterprise (DBE) PARTICIPATION GOAL OF 12% has been established for this project. Bidders shall comply with 49 C.F.R. Part 26 in their efforts to attain this goal. Bidders shall be required to document sufficient DBE participation to meet this goal, or alternatively document good faith efforts to do so. **Davis-Bacon wage rates for Cobb County, GA will also apply.**

(4) Bid Proposal and Contract Documents: (continued)

DBE firms must be certified with the Georgia Department of Transportation's Equal Employment Opportunity (EE0) office.

The **Contractor** and their subcontractors are required to be in compliance with the "Georgia Security and Immigration Compliance Act." The Contractor must execute **and submit at the time of the bid** the "Contractor Affidavit and Agreement," (Page 1.17) **or bid will be determined non-responsive and will be disqualified.**

The **Contractor** must submit a DBE participation report to the **County** prior to beginning work on the project. **A monthly DBE utilization report must be submitted with each monthly invoice.** A final DBE report must be submitted at the end of the project. If DBE participation changes during the course of the project, an updated participation report must be submitted to the **County** at the time of such change. The County strongly supports DBE participation in all contracts.

For all bids for contracts involving utility work as defined in O.C.G.A. 43-14-1 et.seq., the **Contractor and/or subcontractor(s)** that will perform utility work must have a valid state of Georgia Utility Contractor License and comply with all applicable provisions of Chapter 14 of title 43 of O.C.G.A.

All bidders must be on record with Cobb County as having purchased plans and specifications. All bids shall be submitted on the Bid Proposal Form. Any revisions made on the outside of the envelope will not be accepted.

All work performed for this project will be in accordance with the Georgia Department of Transportation Standard Specifications, Construction of Transportation Systems, **Current Edition**, and any modifications identified in the bid documents.

The Bidder shall not subcontract, transfer, assign, or otherwise dispose of the contract or any portion thereof, without the written consent of the County.

The successful bidder shall secure and pay for necessary approvals, permits, assessments, and charges required for the construction and installation of this project as required by local, state, and federal regulations.

Bidders must comply with Title VI of the Civil Rights Act of 1964, the Anti-Kickback Act, the Contract Work Hour Standard Act, and the National Occupational Safety and Health Act of 1970.

Bidders must certify that they do not and will not maintain or provide for their employees any facilities which are segregated on a basis of race, color, creed, or national origin.

The Cobb County Board of Commissioners reserves the right to reject all bids and to waive formalities. Any claims for cost incurred by any Bidder in preparation of any part of or total package for this project will not be considered for reimbursement by Cobb County.

All storm drain shall be R.C.P., side drain pipe may be per GDOT selection chart.

The **Contractor** must meet the current bid requirements of the Georgia Department of Transportation.

An NOI is required on this project.

(5) Utility Issues:

Any Cobb DOT fiber shall be relocated as called out on footnote 1 on drawing 28-02.

Contractor shall submit monthly reports of utility coordination correspondence.

It is the Contractor's responsibility to coordinate all utility relocations.

Utility delays due to lack of coordination on behalf of the contractor will not be considered for reprieve from liquidated damages.

This project is considered by the UPC to be a large ticket item.

(6) Right-of-Way:

The County has acquired all right of way.

(7) Special Items to Note:

All walls shall have an ashlar finish with anti-graffiti coating, cost to be included in price of concrete.

Grass shall be replaced in kind to match grass of existing parcel prior to construction. Sod shall be replaced with Sod, seeded grass shall be replaced with seed. Cost for Sod to be included in the sod bid item.

Note fence removal note on drawing 13-04, parcel 17. Any damage to the brick column to remain shall be repaired by the contractor as his/her expense. Bolt holes remaining in the existing brick column to be retained after removal of the wood support that the fence section is attached to shall be filled in with clear grout. All costs associated with this requirement are to be included in the price bid for Grading Complete per Lump Sum.

The tree at the bus driveway at the Floyd Road Middle School shall remain and not be disturbed. Orange safety fencing shall be placed around the tree for protection.

The contractor attention is called to the notes on drawing 13-09, parcel 38. All work on school property shall occur during non-school times. The school property shall not be unfenced during construction of this project while school is in session.

The contractor's attention is called to General Notes sheet 4-01 and the three notes under CCT Bus Shelter section including but not limited to coordination, construction, relocations, and pay items. Contractor is responsible for removal of existing pad and pouring new pad with conduit.

The traffic signal located on drawings 13-08 and 27A is existing and isn't expected to be relocated. Some signal heads will have to be adjusted but the signal poles and arms were designed to be in their final location for this project. Price to be included in other signal items.

Also on drawing 13-08, the retaining wall on parcel 30 is to be constructed with a curved top. The diameter of the curved top shall be equal to the top of wall width. See note on drawing 13-08 in this regard. All costs to comply with this requirement shall be included in the price bid for the wall.

(7) Special Items to Note: (continued)

All medians to be landscaped shall be excavated to below the existing base and pavement and backfilled with landscaping material. The contractor shall saw cut and remove the existing pavement and base. The median shall be backfilled to a depth of 24" of suitable landscaping material for planting. The 24" shall be rock and debris free. All costs to comply with this requirement shall be included in the price bid for Grading Complete per Lump Sum. Landscape material is defined as: 18 inches of dirt and 6 inches of topsoil.

If required the Contractor shall take three-point levels on Widening and Reconstruction Projects and obtain the Engineer's approval of the "best fit" profile and cross slope, to minimize leveling requirements of the existing roadway. The Contractor must get the Engineer's approval of the proposed best fit before beginning widening and reconstruction. This will also apply to all walls, contractor shall layout walls before constructing them to get Engineers approval

Trees outside of construction limits are to be removed only as directed by the Engineer.

Contractor will be required to mow grass no less than once a month until final acceptance.

(8) Review:

Section 150 Traffic Control

Section 150.08 Enforcement

(9) Questions and Answers:

(10) Questions should be sent via email, **no later than 2:00 p.m. on Monday, March 19, 2012,** to purchasing@cobbcounty.org

Michael S. Cates, P.E.
Construction Engineer

MSC/JSA/jan

ADDENDUM NO. 1

COBB COUNTY DEPARTMENT OF TRANSPORTATION

Floyd Road Widening/Floyd Road Sidewalks

COBB COUNTY PROJECT NO. D12C0

GDOT No. CSMSL-0007-00(132), P.I. No. 0007132

GDOT No. CM-0004-00(510), P.I. No. 0004510

Tuesday, March 13, 2012 1:30 p.m.

NAME	FIRM	OFFICE PHONE/FAX	EMAIL ADDRESS
Jim Navis	Hatch Mott MacDonald	O 404 217 8661 F	james.navis@hatchmott.com
Jeff Neisand	Cobb DOT	O 7-528-3654 F	
[illegible]	Cobb DOT	O 770 420 6659 F	[illegible]
James Hudgins	CCDOT/Arcadis	O 770-420-6658 F 770-528-1620	James.Hudgins@cobbcounty.org
Joe Alexander	CCDOT/Atkins	O 770-528-1663 F	joe.alexander@cobbcounty.org
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ADDENDUM NO. 1

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COBB COUNTY DEPARTMENT OF TRANSPORTATION

Floyd Road Widening/Floyd Road Sidewalks
COBB COUNTY PROJECT NO. D12C0
GDOT No. CSMSL-0007-00(132), P.I. No. 0007132
GDOT No. CM-0004-00(510), P.I. No. 0004510
Tuesday, March 13, 2012 1:30 p.m.

NAME	FIRM	OFFICE PHONE/FAX	EMAIL ADDRESS
Russell Cooke	CCWS	O 770-419-6343 F 770-419-6342	Russell.Cooke@cobbcounty.org
Andy Rikard	CCDOT	O 770 528-3660 F	andy.rikard@cobbcounty.org
Bob Galante	Cobb DOT	O 770-528-1627 F	bgalante@cobbcounty.org
HAVEN THOMAS	CCDOT/ATKINS	O 404 849 2348 F	haven.thomas@cobbcounty.org
Kim MERGEN	CCDOT	O 770-528-3693 F	Kim.mergen@cobbcounty.org
Heath Paige	C.W. Matthews Contr	O 770-422-7520 F 770-422-9361	hpaige@cwmatthews.com

ADDENDUM NO. 1

COBB COUNTY DEPARTMENT OF TRANSPORTATION

Floyd Road Widening/Floyd Road Sidewalks
COBB COUNTY PROJECT NO. D12C0
GDOT No. CSMSL-0007-00(132), P.I. No. 0007132
GDOT No. CM-0004-00(510), P.I. No. 0004510
Tuesday, March 13, 2012 1:30 p.m.

NAME	FIRM	OFFICE PHONE/FAX	EMAIL ADDRESS
Bill Thomas	CC Purchasing	O 7 528 8425 F	bLThomas@cobbcounty.org
Kelly Rosenberger	CCDOT	O 7.528.1636 F	kelly.rosenberger@cobbcounty.org
Drew Raessler	CCDOT	O (7) 528-1695 F	drew.raessler@cobbcounty.org
Brook Martin	CCDOT	O 7-528-4065 F	brook.martin@cobbcounty.org
Ron Snapp	Foley Products	O 404-983-5602 F	r.snapp@foleyproducts.com
DAVID MULLER	COBB DOT/ARCADIS	O 770 528 1651 FM 404 516 4441	DAVID.MULLER@COBBCOUNTY.ORG

Contract No: C 000507 Vendor: _____

Project No: D12C FLOYD ROAD Signature: _____

Group:MSC MISCELLANEOUS

Line No.	Approx Quant.	Item	Unit Price	Amount
5	1.00 LS	205-0100 CONSTRUCTION ALLOWANCE	FIXED	$250,000.00
10	29.00 EA	634-1201 RIGHT OF WAY, PROPERTY LINE IRON PIN Desc: CM-0004-00(510), PI 0004510		
15	30.00 EA	634-1201 RIGHT OF WAY, PROPERTY LINE IRON PIN Desc: CSMSL-0007-00(132) PI NO. 0007132		
20	860.00 LF	647-7434c 3x2" RIGID CONDUIT, DIRECTIONALLY BORED		
25	4.00 EA	999-3015 SPLOST SIGN INSTALLATION, HARDWARE, POSTS	$100.00	$400.00
30	4.00 EA	999-3025 PEACH ROAD SIGN INSTALLATION, HARDWARE/POST	$100.00	$400.00
		TOTAL	MISCELLANEOUS	

Contract No: C 000507 Vendor: _____

Project No: D12C FLOYD ROAD Signature: _____

Group:SW1 SIDEWALK

Line No.	Approx Quant.	Item	Unit Price	Amount
35	1.00 LS	150-1000 TRAFFIC CONTROL Desc: CM-000-0004-00(510), PI 0004510		
40	1.00 ACR	163-0232 TEMPORARY GRASSING		
45	500.00 TON	163-0240 MULCH		
50	44.00 EA	163-0550 CONSTRUCT & REMOVE INLET SEDIMENT TRAPS		
55	2,000.00 LF	165-0030 MAINTENANCE OF TEMPORARY SILT FENCE - TP C		
60	44.00 EA	165-0105 MAINTENANCE OF INLET SEDIMENT TRAPS		
65	4,000.00 LF	171-0030 TEMPORARY SILT FENCE, TYPE C		
70	112.50 CY	207-0203 FOUND BKFILL MATL, TP II		
75	1.00 LS	210-0100 GRADING COMPLETE		
80	405.00 SY	441-0014 DRIVEWAY CONCRETE, 4 IN THICKNESS		
85	6,050.00 SY	441-0106 CONC SIDEWALK, 6 IN		
90	3.00 EA	441-0188 WHEELCHAIR RAMP		
95	210.00 SY	441-4020 CONC VALLEY GUTTER, 6 IN		

Contract No: C 000507 Vendor: _____

Project No: D12C FLOYD ROAD Signature: _____

Group:SW1 SIDEWALK

Line No.	Approx Quant.	Item	Unit Price	Amount
100	10.00 SY	441-4030 CONC VALLEY GUTTER, 8 IN		
105	6,450.00 LF	441-6222 CONC CURB & GUTTER, 8" X 30", TYPE 2		
110	170.00 CY	500-3201 CLASS B CONCRETE, RETAINING WALL		
115	400.00 CY	500-9999 CLASS B CONCRETE, BASE OR PVMT WIDENING		
120	2,660.00 LF	550-1180 STORM DRAIN PIPE, 18 IN, H 1-10		
125	640.00 LF	550-1240 STORM DRAIN PIPE, 24 IN, H 1-10		
130	30.00 LF	550-1300 STORM DRAIN PIPE, 30 IN, H 1-10		
135	430.00 LF	550-1360 STORM DRAIN PIPE, 36 IN, H 1-10		
140	30.00 LF	550-2180 SIDE DRAIN PIPE, 18 IN, H 1-10		
145	2.00 EA	550-3418 SAFETY END SECTION, 18 IN, SIDE DRAIN, 4:1 SLOPE		
150	1.00 EA	611-4001 RECONSTRUCT MINOR DRAINAGE STRUCTURE		
155	39.00 EA	634-1200 RIGHT OF WAY MARKER		
160	75.00 LF	641-1100 GUARD RAIL, TYPE T		

Contract No: C 000507 Vendor: _____

Project No: D12C FLOYD ROAD Signature: _____

Group:SW1 SIDEWALK

Line No.	Approx Quant.	Item	Unit Price	Amount
165	112.00 LF	641-1200 GUARD RAIL, TYPE W		
170	2.00 EA	641-5001 GUARD RAIL ANCHORAGE, TP 1		
175	2.00 EA	641-5012 GUARDRAIL ANCHORAGE, TP 12		
180	333.00 LF	643-8300 ORNAMENTAL FENCE		
185	25.00 EA	668-1100 CATCH BASIN, GP 1		
190	12.00 LF	668-1110 CATCH BASIN, GP 1, ADDL DEPTH		
195	1.50 ACR	700-6910 PERMANENT GRASSING		
200	3.00 TON	700-7000 AGRICULTURAL LIME		
205	2.00 TON	700-8000 FERTILIZER MIXED GRADE		
210	75.00 LB	700-8100 FERTILIZER NITROGEN CONTENT		
215	1,500.00 SY	700-9100 BLOCK SOD Desc: CENTIPEDE		
			TOTAL SIDEWALK	

Contract No: C 000507 Vendor: _____

Project No: D12C FLOYD ROAD Signature: _____

Group:T01 ROADWAY

Line No.	Approx Quant.	Item	Unit Price	Amount
220	1.00 LS	150-1000 TRAFFIC CONTROL Desc: CSMSL-0007-00(132), PI 0007132		
225	1.00 EA	153-1300 FIELD ENGINEERS OFFICE, TYPE 3		
230	1.00 ACR	163-0232 TEMPORARY GRASSING		
235	500.00 TON	163-0240 MULCH		
240	3.00 EA	163-0300 CONSTRUCTION EXIT		
245	4.00 EA	163-0542A CONST & REM STONE FILTER RING		
250	44.00 EA	163-0550 CONSTRUCT & REMOVE INLET SEDIMENT TRAPS		
255	2,000.00 LF	165-0030 MAINTENANCE OF TEMPORARY SILT FENCE - TP C		
260	3.00 EA	165-0101A MAINTENANCE OF CONSTRUCTION EXIT		
265	44.00 EA	165-0105 MAINTENANCE OF INLET SEDIMENT TRAPS		
270	4.00 EA	165-0111 MAINT OF STONE FILTER RING		
275	6.00 EA	167-1000A WATER QUALITY MONITORING AND SAMPLING		
280	18.00 MO	167-1500 WATER QUALITY INSPECTION		

Contract No: C 000507 Vendor: _____

Project No: D12C FLOYD ROAD Signature: _____

Group:T01 ROADWAY

Line No.	Approx Quant.	Item	Unit Price	Amount
285	4,000.00 LF	171-0030 TEMPORARY SILT FENCE, TYPE C		
290	112.50 CY	207-0203 FOUND BKFILL MATL, TP II		
295	1.00 LS	210-0100 GRADING COMPLETE		
300	2,660.00 SY	310-5060 GR AGGR BASE CRS, 6 IN, INCL MATL		
305	20,800.00 SY	310-5120 GR AGGR BASE CRS, 12 IN, INCL MATL		
310	1.00 LS	400-0001 ASPHALT CEMENT INDEX (+/-)	FIXED	$220,000.00
315	3,000.00 TON	402-1802 RECYCLED ASPH CONC PATCHING INCL BIT MATL & H LIME		
320	4,500.00 TON	402-1812 RECYCLED ASPH CONC LEVELING,INCL BIT MAT & HYD LIM		
325	4,580.00 TON	402-3121 RECYC ASP CON 25MM SUPERPAVE, GP1OR2, INC BIT & HL		
330	4,540.00 TON	402-3130 RECYC ASP CON 12.5MM SUPERPAVE,GP2 ONLY,IN BM & HL		
335	2,290.00 TON	402-3190 RECY ASPH CONC 19MM SUPERPAVE, GP1 OR 2 INCL BM&HL		
340	2,490.00 GAL	413-1000 BITUM TACK COAT		
345	1,800.00 SY	432-5010 MILL ASPHALT CONC PVMT, VARIABLE DEPTH		

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Project No: D12C FLOYD ROAD Signature: _____

Group:T01 ROADWAY

Line No.	Approx Quant.	Item	Unit Price	Amount
350	405.00 SY	441-0014 DRIVEWAY CONCRETE, 4 IN THICKNESS		
355	3,850.00 SY	441-0104 CONC SIDEWALK, 4 IN		
360	1,170.00 SY	441-0110 COLOR STAMPED CONC SIDEWALK, 4 IN		
365	2,550.00 SY	441-0748 CONCRETE MEDIAN 6 IN, INCL DOWELS		
370	210.00 SY	441-4020 CONC VALLEY GUTTER, 6 IN		
375	10.00 SY	441-4030 CONC VALLEY GUTTER, 8 IN		
380	6,450.00 LF	441-6222 CONC CURB & GUTTER, 8" X 30", TYPE 2		
385	2,660.00 LF	441-6740 CONC CURB & GUTTER, 8" X 30", TYPE 7		
390	200.00 LF	444-1000 SAWED JTS IN EXIST PVMTS		
395	7,280.00 LF	446-1100 PVMT REINF FABRIC STRIPS, TP 2, 18 INCH WIDE		
400	58.00 CY	500-3201 CLASS B CONCRETE, RETAINING WALL		
405	51.00 CY	500-3800 CLASS A CONCRETE, INCL REINF STEEL		
410	600.00 CY	500-9999 CLASS B CONCRETE, BASE OR PVMT WIDENING		

Contract No: C 000507 Vendor: _____

Project No: D12C FLOYD ROAD Signature: _____

Group:T01 ROADWAY

Line No.	Approx Quant.	Item	Unit Price	Amount
415	2,490.00 LF	550-1180 STORM DRAIN PIPE, 18 IN, H 1-10		
420	200.00 LF	550-1240 STORM DRAIN PIPE, 24 IN, H 1-10		
425	3.00 EA	550-4118 FLARED END SECTION, 18 IN, SIDE DRAIN		
430	500.00 LF	573-2006 UNDERDRAIN PIPE INCL DRAINAGE AGGR, 6 IN		
435	150.00 CY	600-0001 CONCRETE - FLOWABLE FILL		
440	15.00 SY	603-2181 STONE DUMPED RIP RAP, TP 3, 18 IN		
445	15.00 SY	603-7000 PLASTIC FILTER FABRIC		
450	20.00 EA	610-9001 REM SIGNS		
455	5.00 EA	611-3030 RECONSTR STORM SEW MANHOLE, TYPE 1		
460	6.00 EA	611-4001 RECONSTRUCT MINOR DRAINAGE STRUCTURE		
465	14.00 EA	611-5551 RESET SIGN		
470	1.00 EA	611-8050 ADJUST MANHOLE TO GRADE		
475	2.00 EA	632-0003 VARIABLE MESSAGE SIGN, PORTABLE, TYPE 3		

Contract No: C 000507 Vendor: _____

Project No: D12C FLOYD ROAD Signature: _____

Group:T01 ROADWAY

Line No.	Approx Quant.	Item	Unit Price	Amount
480	40.00 EA	634-1200 RIGHT OF WAY MARKER		
485	86.00 SF	636-1018 HWY SIGNS, TY 6 WIDE ANGLE PRIS./FLOU. YELLO-GREEN		
490	858.00 SF	636-1033 HIGHWAY SIGNS, TP 1 MATL REFL SHEETING, TP 9		
495	1,510.00 LF	636-2070 GALV STEEL POSTS TP 7		
500	6,060.00 LF	639-2001 STEEL WIRE STRAND CABLE, 1/4 IN		
505	1.00 EA	639-3004 STEEL STRAIN POLE, TP IV Desc: TWIN 60' MAST ARMS		
510	2.00 EA	639-3004 STEEL STRAIN POLE, TP IV Desc: 30' MAST ARM		
515	2.00 EA	639-3004 STEEL STRAIN POLE, TP IV Desc: 45' MAST ARM		
520	2.00 EA	639-3004 STEEL STRAIN POLE, TP IV Desc: 55' MAST ARM		
525	4.00 EA	639-3004 STEEL STRAIN POLE, TP IV Desc: 60' MAST ARM		
530	300.00 LF	643-1152 CHAIN LINK FENCE, ZINC COAT, 6 FT, 9 GA		

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Group:T01 ROADWAY

Line No.	Approx Quant.	Item	Unit Price	Amount
535	475.00 LF	643-8200 BARRIER FENCE, 4 FT Desc: ORANGE		
540	407.00 LF	643-8300 ORNAMENTAL FENCE		
545	1.00 LS	647-1000 TRAFFIC SIGNAL INSTALLATION Desc: NICKAJACK		
550	1.00 LS	647-1000 TRAFFIC SIGNAL INSTALLATION Desc: HICKS		
555	1.00 LS	647-1000 TRAFFIC SIGNAL INSTALLATION Desc: AYERS/PATTERNS		
560	4.00 EA	647-2160A PULL BOX, PB6		
565	2.00 EA	647-5230 SIGNAL ASSEMBLY, FLASHING SCHOOL, COMPLETE		
570	1.00 EA	647-6090A Loop Detector Desc: 6 FT X 9 FT		
575	10.00 EA	647-6090A Loop Detector Desc: 6 FT X 6 FT		
580	2.00 EA	653-0110 THERMOPLASTIC PVMT MARKING, ARROW, TP 1		
585	55.00 EA	653-0120 THERMOPLASTIC PVMT MARKING, ARROW, TP 2		

Contract No: C 000507 Vendor: _____

Project No: D12C FLOYD ROAD Signature: _____

Group:T01 ROADWAY

Line No.	Approx Quant.	Item	Unit Price	Amount
590	6.00 EA	653-0170 THERMOPLASTIC PVMT MARKING, ARROW, TP 7		
595	2.00 EA	653-0235 THERMOPLASTIC PVMT MARKING, WORD, TP 3B		
600	17,100.00 LF	653-1501 THERMOPLASTIC SOLID TRAFFC STRIPE, 5 IN,WHITE		
605	12,200.00 LF	653-1502 THERMOPLASTIC SOLID TRAFFC STRIPE, 5 IN,YELLW		
610	750.00 LF	653-1704 THERMOPLASTIC SOLID TRAFFIC STRIPE, 24 IN, WHITE		
615	9,520.00 LF	653-1804 THERMOPLASTIC SOLID TRAFFIC STRIPE, 8 IN, WHITE		
620	14,000.00 GLF	653-3501 THERMOPLASTIC SKIP TRAFFIC STRIPE, 5 IN,WHITE		
625	92.00 SY	653-6004 THERMOPLASTIC TRAF STRIPING, WHITE		
630	117.00 SY	653-6006 THERMOPLASTIC TRAF STRIPING, YELLOW		
635	450.00 EA	654-1003 RAISED PVMT MARKERS, TP 3		
640	42.00 EA	668-1100 CATCH BASIN, GP 1		
645	7.00 LF	668-1110 CATCH BASIN, GP 1, ADDL DEPTH		
650	6.00 EA	668-2100 DROP INLET, GP 1		

Contract No: C 000507 Vendor: _____

Project No: D12C FLOYD ROAD Signature: _____

Group:T01 ROADWAY

Line No.	Approx Quant.	Item	Unit Price	Amount
655	1.00 LF	668-2110 DROP INLET, GP 1, ADDL DEPTH		
660	10.00 EA	668-4300 STORM SEW MANHOLE, TP 1		
665	6.00 LF	668-4311 STORM SEW MANHOLE, TP 1, ADDL DEPTH, CL 1		
670	180.00 LF	682-6222 CONDUIT, NONMETL, TP 2, 2 IN		
675	2.00 EA	682-9010 SVC POLE RISER		
680	2.00 ACR	700-6910 PERMANENT GRASSING		
685	3.00 TON	700-7000 AGRICULTURAL LIME		
690	2.00 TON	700-8000 FERTILIZER MIXED GRADE		
695	75.00 LB	700-8100 FERTILIZER NITROGEN CONTENT		
700	3,700.00 SY	700-9100 BLOCK SOD Desc: CENTIPEDE		
705	575.00 SY	716-2000 EROSION CONTROL MATS, SLOPES		
710	6,060.00 LF	935-1114 O/S PLANT FIBER OP CBL, LOOSE TUBE, SGL MODE 36FBR		
715	750.00 LF	935-1511 O/S PLANT FIBER OP CBL DROP SINGLE MODE 6 FIBER		

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Group:T01 ROADWAY

Line No.	Approx Quant.	Item	Unit Price	Amount
720	3.00 EA	935-3401 FIBER OPTIC CLOSURE FDC (RACK MOUNTED), 6 FIBER		
725	12.00 EA	935-4010 FIBER OPTIC SPLICE, FUSION		
730	1.00 LS	935-8000 TESTING		
735	9.00 EA	938-1100 INTERSECTION VIDEO DETECTION SYSTEM ASSY, TYPE A		
		TOTAL	ROADWAY	

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Project No: D12C FLOYD ROAD Signature: _____

Group:W01 WATER

Line No.	Approx Quant.	Item	Unit Price	Amount
740	90.00 LF	660-C276 8 IN. DI SJ CL50 PIPE: 6-8 FT DEPTH		
745	1.00 EA	660-C494 ADJUST EXISTING MH TO GRADE IN PAVEMENT 0-1 FT.		
750	1.00 EA	660-C504A 4 FT. DIAMETER DOGHOUSE MANHOLE: 6-8 FT DEPTH		
755	1.00 EA	660-C532* CONNECTION TO EXIST. MANHOLE, EXTRA Desc: 8" CORE AND BOOT		
760	1.00 EA	660-C577 STANDARD RING AND COVER		
765	50.00 LF	670-1010 2" COPPER WATER LINE		
770	75.00 LF	670-C017* 6" WATER MAIN (DI)		
775	5,850.00 LF	670-C018* 8" WATER MAIN (DI)		
780	2,745.00 LF	670-C020* 12" WATER MAIN (DI)		
785	1,200.00 LF	670-C111 8 IN DIP (CL50) SJ WATER MAIN, 0-4 FT DEEPER		
790	900.00 LF	670-C120X 12 IN DIP (CL50) SJ WATER MAIN, 0-3 FT DEEPER		
795	5.00 EA	671-0120* ADJUST EXISTING METER BOX TO GRADE Desc: 1" METER AND BOX		
800	9.00 EA	672-C025 REMOVE EXISTING FIRE HYDRANT		

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Project No: D12C FLOYD ROAD Signature: _____

Group:W01 WATER

Line No.	Approx Quant.	Item	Unit Price	Amount
805	7.00 EA	672-C034 ABANDON EXISTING 3/4-INCH SERVICE LINE AT MAIN		
810	2.00 EA	672-C036 ABANDON EXISTING WATER MAIN IN PLACE 2 IN.		
815	1.00 EA	672-C039 ABANDON EXISTING WATER MAIN IN PLACE 6 IN.		
820	5.00 EA	672-C040 ABANDON EXISTING WATER MAIN IN PLACE 8 IN.		
825	13.00 EA	672-C042 ABANDON EXISTING WATER MAIN IN PLACE 12 IN.		
830	17.00 EA	672-C121* 6" GATE VALVE AND BOX		
835	29.00 EA	672-C122 8 IN. GATE VALVE		
840	14.00 EA	672-C124* 12" GATE VALVE AND BOX		
845	5.00 EA	672-C150A ABANDON EXISTING GATE VALVE, IN PAVEMENT		
850	22.00 EA	672-C150B ABANDON EXISTING GATE VALVE, OUT OF PAVEMENT		
855	10.00 EA	672-C153 CONCRETE VALVE MARKER		
860	31.00 EA	672-C156 ADJUST EXISTING VALVE BOX TO GRADE OUT OF PAVEMENT		
865	1.00 EA	672-C157A ADJUST METER VAULT TO GRADE		

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Group:W01 WATER

Line No.	Approx Quant.	Item	Unit Price	Amount
870	0.11 TON	672-C164 6 IN. MJ MISC. FITTINGS		
875	3.21 TON	672-C165 8 IN. MJ MISC. FITTINGS		
880	2.79 TON	672-C167 12 IN. MJ MISC. FITTINGS		
885	12.00 EA	672-C473 THREE-WAY FIRE HYDRANT 4 FT. BURY		
890	9.00 EA	672-C474 THREE-WAY FIRE HYDRANT 5 FT. BURY		
895	3.00 EA	672-C479 RELOCATE EXISTING FIRE HYDRANT Desc: HORIZONTAL EXTENSION		
900	1.00 EA	672-C479 RELOCATE EXISTING FIRE HYDRANT		
905	20.00 VF	672-C480 FIRE HYDRANT EXTENSION		
910	17.00 EA	672-C485 6X13 ANCHOR COUPLING		
915	1.00 EA	672-C527* CONNECTION TO EXISTING 6" WATER MAIN Desc: WET NO TAP		
920	1.00 EA	672-C528* CONNECTION TO EXISTING 8" WATER MAIN Desc: WET NO TAP		
925	13.00 EA	672-C528* CONNECTION TO EXISTING 8" WATER MAIN Desc: CUT IN		

Contract No: C 000507 Vendor: _____

Project No: D12C FLOYD ROAD Signature: _____

Group:W01 WATER

Line No.	Approx Quant.	Item	Unit Price	Amount
930	1.00 EA	672-C529* CONNECTION TO EXISTING 10" WATER MAIN Desc: CUT IN		
935	13.00 EA	672-C530 CONNECTION TO EXISTING 12" WATER MAIN Desc: CUT IN		
940	1.00 EA	672-C530 CONNECTION TO EXISTING 12" WATER MAIN Desc: WET NO TAP		
945	21.00 EA	673-C017 RELOCATE EXISTING WM 3/4 IN. SHORT SIDE		
950	6.00 EA	673-C018 RELOCATE EXISTING WM 1 IN. SHORT SIDE		
955	4.00 EA	673-C019 RELOCATE EXISTING WM 1 1/2 IN. SHORT SIDE		
960	3.00 EA	673-C020 RELOCATE EXISTING WM 2 IN. SHORT SIDE		
965	1.00 EA	673-C024 RELOCATE EXISTING FM WM 8 IN. SHORT SIDE		
970	1.00 EA	673-C027 RELOCATE EXISTING DC WM 6 IN. SHORT SIDE Desc: 6" DDC AND VAULT		
975	1.00 EA	673-C028 RELOCATE EXISTING DC WM 8 IN. SHORT SIDE		
980	16.00 EA	673-C062 SERVICE LINE REPLACEMENT, SHORT SIDE, 3/4 IN		
985	7.00 EA	673-C064 SERVICE LINE REPLACEMENT, SHORT SIDE, 1 IN		

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Group:W01 WATER

Line No.	Approx Quant.	Item	Unit Price	Amount
990	3.00 EA	673-C066 SERVICE LINE REPLACEMENT, SHORT SIDE, 1 1/2 IN		
995	3.00 EA	673-C078 SERVICE LINE REPLACEMENT, SHORT SIDE, 2 IN		
1000	75.00 SY	674-C003H ASPHALT PAVEMENT TRENCH PATCH		
1005	1.00 LS	674-C031 UTILITY ALLOWANCE	FIXED	$35,000.00
1010	1.00 LS	675-0029 LANDSCAPE ALLOWANCE	FIXED	$15,000.00
1015	355.00 SY	675-C026A CONCRETE TRENCH CAP		
1020	65.00 HR	675-C055 ADDITIONAL WORK, WATER SYSTEM Desc: EXPLORATORY EXCAVATION	$250.00	$16,250.00

TOTAL WATER

TOTAL MISCELLANEOUS

TOTAL SIDEWALK

TOTAL ROADWAY

GRAND TOTAL D12C0 FLOYD ROAD

FINAL PAGE

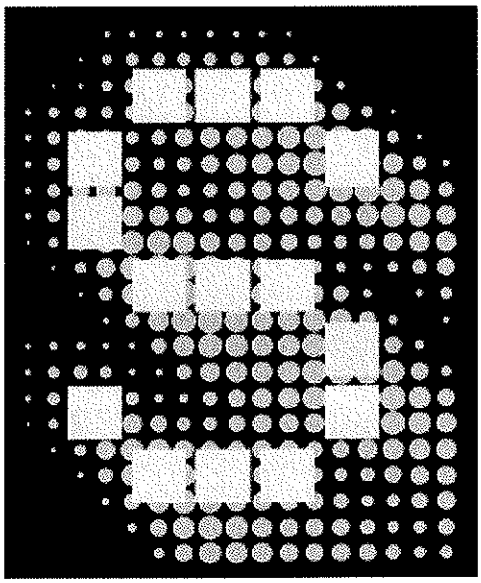
SILENT MESSENGER

SOL-R-SIGN™

SOLAR POWERED

PORTABLE DYNAMIC MESSAGE SIGN

PROCUREMENT SPECIFICATION



SOLARTECH®

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Phone: 610-391-8600 Fax: 610-391-8601
Website: www.solartechnology.com

Harness the Power of the Sun

ADDENDUM NO. 1

This document presents a detailed specification for a full-size solar powered portable dynamic (changeable) message sign. This specification typically requires additions and/or modifications to meet a user's specific requirements.

This specification is subject to periodic revisions as required without notice.

P/N 500-524-180

Fouteenth edition: 01 September 2009

General email: info@solartechnology.com
Technical Support email: techsupport@solartechnology.com

Web site: www.solartechnology.com

1. General

1.1 Product Description

The **SILENT MESSENGER** is a solar powered portable dynamic message sign. The **SILENT MESSENGER** consists of a sign display panel, a supporting structure for the sign display panel, a photovoltaic array, a battery power supply, an energy management system control unit and an electronic control console, all mounted on a heavy duty trailer frame.

1.2 Design Objectives

1.2.1 Maximize reliability by using generally accepted design techniques for outdoor-use electrical and electronic equipment.

1.2.2 Minimize operating cost by using a renewable energy source, requiring minimal maintenance.

1.2.3 Maximize safety and effectiveness by using a non-glare, high contrast display panel with long-life expectancy, high-reliability display technology.

1.2.4 Meet or exceed the standards for Portable Changeable Message Signs as listed in the U.S. Federal Highway Administration (FHWA) Manual on Uniform Traffic Control Devices (MUTCD).

1.3 Performance Objectives

1.3.1 Visibility up to 1 mile.

1.3.2 Legibility up to 1/2 mile.

1.3.3 Minimal glare from sunlight and headlights.

1.3.4 Continuous, uninterrupted operation on solar power.

1.3.5 One month minimum, three month typical maintenance interval.

1.4 Quality Assurance Objectives

1.4.1 All manufacturing shall be carried out in a facility with a completely implemented and properly maintained ISO 9001:2008 certified quality management system.

1.4.2 All units shall bear the CE Mark indicating acceptable EMC (Electromagnetic Compatibility) to insure that the units are neither susceptible to nor produce any electromagnetic interference.

1.4.3 Manufacturer shall have a factory authorized service center located within 150 miles of point of delivery. Authorized service center shall receive all units from factory in order to inspect for any shipping damage and verify proper operation prior to final delivery. Delivery directly from manufacturer's facility without inspection by an authorized service center shall not be permitted. Additionally, authorized service center shall be capable of performing warranty service and repairs, and shall provide on-site training on the proper use and maintenance of all equipment delivered.

ADDENDUM NO. 1

2. Physical

2.1 Dimensions

2.1.1 Length Overall - 180 in. (457 cm)

2.1.2 Width Overall - 92 in. (234 cm)

2.1.3 Height

2.1.3.1 Sign in transport position - 103 in. (262 cm)

2.1.3.2 Sign in operating position - 162 in. (412 cm)

2.1.4 Ground Clearance, minimum - 13 in. (33 cm)

2.1.5 Weight - 2,960 lbs. (1,343 kg) (maximum)

2.2 Environmental

2.2.1 Temperature, operating and storage - -40 to +185 ^{0}F (-40 to +85 ^{0}C)

2.2.2 Relative Humidity - 20% to 98%, non-condensing

2.2.3 Wind

2.2.3.1 Transport position, maximum trailering speed - 70 MPH (112 KPH)

2.2.3.2 Operating position, max. height, outriggers in place - 80 MPH (128 KPH) sustained

2.2.4 Electrical Interference - Unaffected by RFI (Radio Frequency Interference) and EMI (Electromagnetic Interference).

3. Trailer Chassis and Sign Support

3.1 Trailer Chassis

3.1.1 Frame Construction

3.1.1.1 Trailer frame shall be constructed of welded 7 Gauge (3/16-inch) CNC formed steel plate and structural steel tubing with 3 x 5 x 3/16 inch structural steel tubing extending from the sign mast mounting frame cross-members forward to the coupler/brake actuator. Tongue shall be braced with diagonal 2 x 4 x 11 gauge tubing extending outward from the forward section of the tongue at 45 degrees, rearward to the front main cross member.

3.1.1.2 Trailer shall be equipped with a 7 Gauge (3/16-inch) CNC formed steel plate rear cross member to provide support for sign panel and protect structure against rear end collisions.

3.1.1.3 Trailer frame shall be equipped with tie down points to facilitate securing unit to utility trailer or truck deck for transport.

3.1.2 Suspension and Brake System (Note: brakes are an optional upgrade)

3.1.2.1 Trailer shall be equipped with an independent suspension, torsion-type axle with hydraulic brakes. Axle load capacity shall be set to 3,400 pounds (Note: brakes are an optional upgrade).

3.1.2.2 Axle wheel spindles shall be equipped with spindle bearing caps with grease fittings to accommodate wheel bearing lubrication.

3.1.2.3 Trailer shall be equipped with a bolt-on 7,500-pound capacity hydraulic surge brake actuator (Note: brakes are an optional upgrade).

3.1.2.4 Hydraulic surge brake actuator shall be equipped with an emergency break-away cable to automatically set the trailer brakes in the event of a coupler separation from the tow vehicle (Note: brakes are an optional upgrade).

3.1.3 Coupler

3.1.3.1 Trailer shall be equipped with an adjustable height coupler mount capable of accepting either a 2-inch ball or a 3-inch pintle ring coupler, both with minimum capacity ratings of 5,000 lbs.

3.1.3.2 Trailer shall be equipped with 1/4-inch safety chains with snap-type hooks for secure attachment to tow vehicle hitch.

3.1.3.3 All trailer hitch components shall comply with SAE J684 standards for Class II (2) trailers.

3.1.4 Surface Preparation and Finishing

3.1.4.1 Trailer chassis and superstructure shall be completely cleaned and deburred prior to finishing. All metal surfaces shall be prepared for finishing using an iron phosphate wash-down process.

3.1.4.2 A polyamide epoxy primer shall be applied to a dry film thickness of 2.5 mils.

3.1.4.3 A high gloss federal safety orange aliphatic acrylic urethane finish shall be applied to a dry film thickness of 2.5 mils.

ADDENDUM NO. 1

3.1.5 Lighting

3.1.5.1 Trailer shall be equipped with sealed flush-mounted combination stop, tail and turn lights.

3.1.5.2 Trailer shall be equipped with flush-mounted front and rear side marker lights.

3.1.5.3 Trailer shall be equipped with a rear center identification light bar.

3.1.5.4 Trailer shall be equipped with a lighted license plate holder.

3.1.5.5 Trailer wiring harness shall be completely sealed and water resistant.

3.1.6 Fenders

3.1.6.1 Trailer shall be equipped with unbreakable, molded, solid color, UV-stabilized HDPE (High Density Polyethylene) fenders, completely closed on the inner side to protect trailer frame.

3.1.6.2 Fenders shall be secured to trailer frame with zinc-plated steel thread forming screws and fender washers so as to facilitate easy repair or replacement.

3.1.7 Leveling Jacks

3.1.7.1 Trailer shall be equipped with four swivel type screw jacks, minimum capacity rating of 2,000 pounds, mounted at each corner of the trailer frame.

3.1.7.2 The outrigger jacks shall be capable of lifting the trailer frame so trailer wheels and tires can be removed for additional security.

3.1.7.3 Trailer shall be constructed such that the outrigger jacks are protected by 7 Gauge (3/16-inch) CNC formed steel plate guards when the jacks are in the travel position to prevent damage to jacks during transport.

3.1.8 Tires and Wheels

3.1.8.1 Tires shall be ST225/75R15 Load Range C.

3.1.8.2 Wheels shall be 15-inch x 6-inch, 5-lug pattern (4 1/2-inch bolt circle), white spoke dress wheel.

3.1.8.3 Wheels and tires shall be sized in accordance with load requirements of trailer and axle.

3.2 Sign Support

3.2.1 Sign panel shall be attached to a telescoping mast assembly to facilitate raising and rotating the display panel from the transport position to the operating position safely and quickly by an unassisted operator.

3.2.2 The mast shall consist of a lower assembly and an upper assembly with a hydraulic cylinder mounted inside to provide for raising and lowering the message display panel.

3.2.3 A hydraulic power unit, mounted inside a lockable, weather-resistant, molded HDPE (High Density Polyethylene) enclosure, shall provide sufficient flow to raise the sign panel to the full operating position in less than twenty (20) seconds. The hydraulic power unit shall be equipped with a manual bypass dump valve to permit lowering of the mast in the event of a hydraulic control valve failure or total loss of electrical power.

3.2.4 The lower mast shall be fabricated from 6 x 6 x 3/16-inch structural steel tubing inserted through a 5\16-inch steel plate secured to the trailer frame with eight 5\8-inch diameter steel bolts.
The lower mast assembly shall be reinforced with 5/16-inch steel gusset plates located below the trailer deck.

3.2.6 The upper mast shall be fabricated from 8-inch structural steel round tubing.

3.2.7 The mast assembly shall be equipped with a dual cam locking mechanism located at the bottom of the upper mast. The dual cam locking mechanism shall secure the message display panel in the appropriate viewing position. The locking cam mechanism shall automatically tighten to resist turning in windy conditions. Friction type (disc or band brake) locking mechanisms are not acceptable as slippage can occur in high wind conditions.

3.2.8 The message display panel support mechanism shall be capable of being rotated through 360^0 and locked into position, at any angle.

3.2.9 The message display panel rotation locking mechanism shall permit the operator to lock the message display into position, safely, at ground level, prior to elevation to full operating height.

3.2.10 The message display panel shall be equipped with a sighting device to facilitate proper alignment during setup.

3.2.11 The upper and lower mast assemblies shall be equipped with nylatron wear pads to provide for smooth easy movement and to avoid metal to metal contact. The message display support mast shall be capable of extended operation without lubrication. Nylatron wear pads shall be adjustable to compensate for normal wear.

3.2.12 Message display panel support structure shall be of non-welded, modular construction to facilitate quick easy repair in the event of accidental damage.

3.2.13 Message display panel shall be secured to a steel superstructure with stainless steel hardware and nylon spacers to minimize the effects of corrosion.

3.2.14 All mounting hardware shall be locking-type.

3.2.15 Heavy gauge steel cradles equipped with rubber bumpers and HDPE wear pads shall securely support sign panel against vertical and lateral movement during transport. No locking pins or latches will be permitted. Sign panel shall automatically lock into the transport position, without operator intervention, when the sign panel upper mast is fully retracted.

4. Message Display Panel

4.1 Dimensions

4.1.1 Width Overall - 126 in. (320 cm)

4.1.2 Height Overall - 76 in. (193 cm)

4.1.3 Depth Overall - 6 in. (15 cm)

4.2 Construction

4.2.1 Message Display Panel Case

4.2.1.1 The message display panel case shall be constructed of heavy duty aluminum extrusion secured at each corner by a molded, fiberglass-reinforced plastic corner and black powered coated stainless steel torx head screws and nylon insert locknuts.

4.2.1.2 The back of the message display panel case shall be constructed of aluminum sheet bonded and riveted to the case frame.

4.2.1.3 Interior of message display panel case shall be equipped with fabricated extruded aluminum channels to reinforce the display case and to support internal wiring and cables.

4.2.1.4 The display panel case shall be equipped with eight breather filter vents, designed to allow the flow of vapor but not fluid, located at the top and bottom of the case to provide adequate ventilation to minimize condensation and fogging of the display panel door.

4.2.2 Message Display Panel Door

4.2.2.1 The display panel door shall be constructed of heavy duty extruded aluminum secured at the corners with glass fiber reinforced molded plastic inserts and black powered coated stainless steel torx head screws and nuts.

4.2.2.2 The door shall fit within a flange around the perimeter of the message display panel case frame to provide for a secure weatherproof enclosure.

4.2.2.3 A rubber seal shall be located inside of the flange on the case frame to provide a water tight, dust tight closure.

4.2.2.4 The message display panel shall be enclosed over the display area by a 3/16-inch thick clear UV resistant, scratch resistant, acrylic coated polycarbonate material with a non-glare outer surface to reduce reflection of ambient light and oncoming vehicle head lamps.

4.2.2.5 The polycarbonate material shall be secured in the door frame with an extruded rubber u-channel to provide a cushioned, weatherproof seal.

4.2.2.6 The message display panel door shall be secured in the open position for servicing by a pair of zinc-plated steel telescoping lid supports equipped with automatic latches. The door supports shall be located completely inside of the display panel housing, protected from weather.

4.2.2.7 The display panel door shall be secured in the closed position with adjustable, positive locking, stainless steel draw latches.

4.2.2.8 The message display panel door and case shall be equipped with stainless steel locking hasps capable of accepting standard padlocks to secure the door in the closed position.

4.2.3 Surface Preparation and Finishing

4.2.3.1 Message display panel case and door shall be completely cleaned and deburred prior to finishing. All metal surfaces shall be prepared for finishing using an iron phosphate wash-down process.

4.2.3.2 A wash primer shall be applied to all prepared metal surfaces prior to applying final finish.

4.2.3.3 A matte black acrylic urethane finish shall be applied to a dry film thickness of 2.5 mils.

4.3 Display Characteristics

4.3.1 The message display area shall be approximately 120 inches in width by 70 inches in height.

4.3.2 The display area shall consist of a continuous (full) matrix of 48 pixels or dots in width by 27 pixels in height (models MB-1548, MB-2248, MB-3048, MB-3748 and MB-4048), or 56 pixels in width by 30 pixels in height when equipped with the optional high definition display (models MB-1556, MB-2256, MB-3056, MB-3756 and MB-4056).

4.3.3 The pixels or dots shall consist of three (3) LEDs (Light Emitting Diodes) arranged in a triangular pattern so as to produce the appearance of a round image or dot at normal viewing distances.

4.3.4 The display color shall be amber (592 nanometer wavelength).

4.3.5 The display shall produce a brightness greater than 10,000 candela per square meter at maximum intensity.

4.3.6 The display shall produce a minimum viewing angle of 24 degrees standard (60 degrees when equipped with optional Mega-Flux LED display), with consistent intensity and color across the entire display panel.

4.3.7 The message display shall be capable of displaying one, two, three or four lines of alphanumeric characters or text with a nominal character height ranging from a minimum of 13 inches (33 cm) to a maximum of 52 inches (132 cm).

4.3.8 The message display panel shall be capable of displaying three lines of text with a minimum of three pixels (7.5 inches / 19 cm) between lines.

4.3.9 The message display shall also be capable of displaying graphic images and symbols using the full 48 pixel width and 27 pixel height (56 pixel width by 30 pixel height when equipped with the optional high definition display).

4.4 Display Modules

4.4.1 Display modules shall be mounted in the sign panel using captive 1/4-turn wing-head fasteners to permit quick, easy module replacement without the need for any tools.

4.4.2 Display modules shall be mounted on rubber cushions to provide shock absorption during transport and to accommodate thermally-induced expansion and contraction of message display panel during operation.

4.4.3 Display module control circuitry shall include a fail-safe device, also know as a watchdog timer, to automatically monitor the performance of the display module and provide a reset / restart command to the on-board microcontroller in the event of any disruption of normal operation.

4.4.4 Display module control circuitry shall be designed to accommodate "hot swapping" - exchange of display modules while sign is operating.

4.4.5 The message display shall consist of an array of identical display modules capable of functioning in any position without the need for switch or jumper setup or special programming.

4.4.6 Display modules and message display panel shall accommodate complete service and exchange of display modules without the need for any tools.

4.4.7 Display modules shall be equipped with locking-type electrical / electronic connectors to provide secure, reliable operation while permitting quick, easy service and repair of message display.

4.5 Cables and Wiring

4.5.1 All message display panel wiring and cables shall be equipped with modular power and signal connectors to permit repairs without the need for any tools.

4.5.2 All power circuit connectors shall use tin or silver plated contacts.

4.5.3 All signal circuit connectors shall use gold plated or gold flashed contacts.

4.5.4 All system wiring, power and signal, shall consist of marine grade wire and cable, with multi-strand, tin-plated conductors.

4.5.5 All power and sign panel signal wiring and cables shall be installed in nonmetallic, flexible, liquid-tight conduits. All conduit fittings shall be installed with rubber sealing rings to maintain liquid-tight characteristics.

5. Main Control Console

5.1 Physical

5.1.1 Control console shall be enclosed in a weather resistant, lockable, molded HDPE (High Density Polyethylene) enclosure secured to the trailer chassis.

5.1.2 Control console shall be completely sealed to accommodate operation in all types of weather.

5.1.3 Control console shall be mounted on heavy duty slides which allow the control console to slide up and pivot into a position enabling the operator to program the unit while facing traffic from a comfortable standing position. A controller location which requires the operator to stoop, bend or kneel for operation such that the operator cannot see approaching traffic shall not be permitted. Slide mechanism shall permit quick, easy removal of control console without the need for any tools.

5.1.4 Control console power and control cables shall include sealed, locking-type connectors to permit quick, easy removal of control console without the need for any tools.

5.1.5 Control console front panel shall consist of a backlit full color LCD (liquid Crystal Display) with integrated industrial grade touch-screen, sealed and waterproof, to provide a reliable and user-friendly interface for the operator under any weather condition.

5.2 General Operation

5.2.1 Control console shall provide for the complete control of the dynamic message sign, including remote control, radar speed monitoring and radar data collection (when equipped with optional radar speed monitor), dynamic message sign geographic location monitoring (when equipped with optional GPS receiver), and sign panel orientation monitoring (when equipped with optional digital flux-gate compass), without the need for additional hardware, software, external computers or hand-held control devices.

5.2.2 Control console shall include all necessary hardware and software to operate the dynamic message sign, locally and remotely (including web-access, NTCIP, and UTMC), including radar speed monitoring and data collection (when equipped with optional radar speed monitor), geographic location monitoring (when equipped with optional GPS reciever), and sign panel orientation monitoring (when equipped with optional digital flux-gate compass) both locally and remotely.

5.2.3 Control console, in conjunction with the message display panel, shall have the capability of monitoring and detecting sign panel communication loop failures. In the event of a sign panel communication loop failure, the control console, in the case of soft errors (temporary disruption of message display), shall have the ability to correct the failure immediately and in the case of hard errors (hardware failure), shall have the ability to completely blank the sign panel so as to prevent the display of incorrect, potentially misleading messages. Control console shall have the capability of reporting sign panel operational status remotely (including web-access, NTCIP, and UTMC). Additionally, control console shall have multiple diagnostic modes (manual and automatic - local and remote) for troubleshooting sign panel to enable an operator to quickly track down and replace a faulty display module in the sign panel.

5.2.4 Control console embedded CPU shall incorporate a soft-core microprocessor design to insure future hardware and software compatibility through upgrades provided by manufacturer free for life of the machine. Operating system shall be Linux based and include multiple watchdog timers to ensure automatic restarts in the event that any critical function stops working properly.

5.2.5 Control console shall be capable of connection to any standard IBM or compatible desktop or portable (lap-top) computer via a standard serial interface (COM) or Ethernet port to facilitate routine service or repair, extensive diagnostics, and the analysis of user files or operating programs.

5.2.6 Control console shall be equipped with at least one USB port, one Ethernet port, one serial port (DB-9 connector), six (6) digital outputs, six (6) digital inputs, and two (2) analog inputs.

5.2.7 Control console shall be capable of driving more than one sign panel for dual sign panel installations.

5.2.8 Control console operating processor, firmware and software shall be field (locally) upgradeable with a standard USB flash-drive (memory key) or remotely upgradeable over an IP addressable network connection - wire-line or wireless via IP addressable modem. Upgrades shall be provided by manufacturer free of charge for life of machine.

5.2.9 Full color LCD display shall be equipped with an automatic backlighting with automatic dimming capability to accommodate both direct sunlight daytime and low ambient light level night time operation. Backlighting shall automatically activate upon any touch-screen activity and remain on for five minutes following the last touch-screen activity. Additionally, an automatic log-out feature shall be incorporated to insure security of the unit when left unattended. Automatic log-out feature shall be capable of being disabled by the operator as desired.

5.2.10 Main power to the sign panel and the control console shall be controlled by a combination switch and circuit breaker in order to provide electrical protection without the need for fuses. All connections to controller and Energy Management System shall be made with locking type quick disconnect connectors. The use of fuses and/or terminal strips for connections shall be strictly forbidden.

5.3 Programming

5.3.1 Control console shall provide an intuitive icon-driven graphical user interface (GUI) along with step by step instructions to the operator, via the LCD display, as the various programming functions are performed, for simple easy programming and operation. On-screen help files shall be included in all languages. Control console shall support a minimum of six (6) operating languages (English, Spanish, French, Dutch, German and Portuguese) and four (4) standard keyboards (English, French, Portuguese/ Spanish, and Arabic) along with associated font sets. Controller shall be capable of being setup for either a US Standard DOT, US 3-Line DOT, Ontario MTO-2 or an International font set by an operator with Administrator access to prevent unauthorized use of inappropriate fonts by operators with User access.

5.3.2 Control console shall be capable of storing all messages in alphabetical order by the first letter of the first word of the name assigned to the message to permit quick recall of messages without the need for maintaining a numeric listing of pages and/or messages. Messages shall be automatically sorted any time messages are added to or deleted from the library. Because of difficulty in locating and retrieving stored pages and/or messages via numerical codes, number coded storage of pages and/or messages requiring any form of a lookup table/directory shall be strictly forbidden.

5.3.3 Control console shall accommodate a minimum of fifty (50) full alphanumeric passwords each providing one of four levels of access to various control console functions. Each password shall allow access to only the functions required by that particular dynamic message sign operator. The four levels of access are as follows:

Quick-Picks	Select from up to six (6) pre-programmed messages with no programming required. Simply touch a message for display. No access to any permanent data files.
User Menu	Create, Edit, Delete, Save, Display, and Schedule messages. Create, Assign and Edit Quick-Picks. Check System Status and perform basic diagnostics.
Supervisor Menu	All User Menu Functions. Create and delete Quick-Picks and User passwords. Set system operating parameters.
Administrator Menu	All Supervisor Functions. Create and delete Administrator and Supervisor passwords. Set controller operating parameters.

5.3.4 Control console shall be capable of displaying a message on the message sign display panel during such time as the operator may be adding, editing or deleting messages from the control console user files. Blanking of the message sign display panel during normal operator activity is considered unsafe and shall be strictly forbidden.

5.3.5 Control console shall be capable of monitoring ambient light conditions and making appropriate adjustments to the intensity of the sign panel to maintain an acceptable display contrast during all ambient lighting conditions. The control console shall provide a minimum of sixteen (16) intensity levels between minimum and maximum display brightness. An operator with Supervisor access shall be capable of adjusting the upper and lower photocell set-points as to adjust the overall range for the automatic brightness control to accommodate any local variations in ambient lighting.

5.3.6 Control console shall be equipped with Scheduler that utilizes a real time clock and calendar feature to accommodate automatic, unattended changing of messages at predetermined dates and times. Scheduler shall support unique, single event schedules along with recurrent schedules such that messages may be easily scheduled for daily, weekly or monthly repetition. Recurrent schedules shall be capable of incorporating a start and stop date as desired. Scheduler shall also be capable of displaying messages based upon data driven events such as input from a radar gun, photocell, battery voltage, temperature and/or switch closures (up to eight). Data driven events shall also be capable of being restricted to specific dates and times. Scheduler shall incorporate a priority system for resolution of conflicting schedules and/or events to permit one schedule/event to override another based upon level of importance (i.e. priority). Additionally, the control console shall have the capability to create and display on the sign panel an Override Message that takes priority and overrides all programmed Schedules and Events until cleared to enable an operator to display a message continuously on the sign panel regardless of programmed schedules and/or events.

5.3.7 Control console shall provide special function buttons to provide access to common user functions in a single step including (from the main log-on sceen) selecting control console Operating Language, Blanking the Sign Panel, creating an Instant Message, and selecting from Quick Picks.

5.3.8 Control console shall provide a system status page that enables an operator to quickly and easily determine the unit's current time, date, photocell reading, battery bank voltage, temperature, MAC address, IP address, run-time since last re-boot, current run-time (resettable timer), lifetime run-time, and serial modem type along with modem signal strength and quality, latitude & longitude and sign panel heading.

5.3.9 Control console shall be capable of storing a minimum of 500 messages, each message capable of accommodating a minimum of 200 pages (text or graphic images). Control console shall be equipped with an upgradeable flash memory card such that memory can be increased to support storing a minimum of 2,000 messages.

5.3.10 Control console shall provide a minimum of ten font sizes (with full uni-code support for each font) including an adaptive font that automatically and dynamically sizes text to fit on a page as it is typed such that the largest font is always used for a given amount of text on a page to ensure maximum visibility and legibility. One of the included font sizes shall be a standard 5x7 DOT pixel font.

5.3.11 Control console shall support the incorporation of multiple dynamic data sources per page during message creation such that multiple pages within a message can include output from multiple dynamic data sources. Pages containing dynamic data sources shall be automatically refreshed and updated prior to every display such that the most recent data is always displayed on the sign panel. System shall include, as a minimum, the following data sources: radar gun (if equipped), real-time clock (time and date - day, month, year and time in various formats), photocell (ambient light level), battery voltage, and countdown & count-up features from a specified date and/or time. System shall also provide operator with the ability to create and incorporate additional dynamic data sources for display and scheduler control for maximum flexibility during system integration.

5.3.12 Control console shall be capable of page display times from 0.1 seconds to a minimum of 99 seconds in 0.1 second increments.

5.3.13 Control console shall be capable of displaying messages in a preview screen, during message creation, editing or selection, exactly as they will appear on the message display panel.

5.3.14 Control console shall permit the editing of messages that are currently being displayed, showing the revised message as soon as message editing has been completed.

5.3.15 Control console shall enable an operator to create, copy, add/insert, move about, edit and delete/remove pages to/from a message dynamically during message creation and/or editing. It shall not be necessary to create pages first and then assemble the pages into a message. Additionally, control console shall have the ability to insert pages and/or messages from a master library into a new message and move them about within the message. Control console shall also accommodate the creation and editing of graphic images directly from the GUI during message creation. Additionally, control console shall provide the operator with the ability to easily flash a page within a message, flash a line(s) within a page and/or add static or dynamic arrows/chevrons to a page within a message through the use of page annotations.

5.3.16 Control console shall provide a selection of standard highway work zone sign graphic images, including but not limited to: fixed left and right arrow images, moving or sequential left and right arrow images, and moving or sequential left and right chevrons, etc.

5.3.17 Control console shall provide the capability to display battery bank voltage to 0.1 Volt accuracy directly on the control console display.

5.3.18 Control console shall provide for a user selectable low-battery-voltage caution message when the battery voltage drops to a user specified level (above the low-battery automatic shut down voltage). The low-battery-voltage caution message shall be user programmable by an operator with Supervisor access.

5.3.19 Control console shall be equipped with three (3) Run-Time counters: an Up-Time counter that indicates total number of days, hours and minutes since last re-boot, a Current Run-Time counter that indicates total hours of operation since last reset of the counter (resettable run-time counter), and a Lifetime Run-Time counter that indicates total hours of control console operation (non-resettable).

5.3.20 Control console shall include the ability to reset the Current Run-Time counter, Message Library, Scheduler, and all Factory Settings automatically, individually or all at once through performing a variety of Master Resets which will clear all memory and reset all settings to original factory setpoints to various levels.

5.3.21 Control console shall support both dynamic and static IP address network connections along with serial dial-up modem communications.

5.3.22 Control console shall provide a method for setting a battery offset to calibrate battery voltage readings.

5.3.23 Control console shall provide a method for switching radar gun output from MPH to KPH directly from control console GUI.

5.3.24 Control console shall be NTCIP compatible. The following NTCIP standards must be supported:

NTCIP 1201 (v3.03b) - Global Object Definitions
NTCIP 1203 (v2.35a) - Object Definitions for Dynamic Message Signs
NTCIP 2101 (v1.19) - Subnetwork Profile: PMPP over RS232
NTCIP 2104 (v1.11) - Subnetwork Profile: Internet
NTCIP 2201 (v1.15) - Transport Profile: Transportation
NTCIP 2202 (v1.05) - Transport Profile: Internet

Unit shall support an administrator community string along with 255 other communities. Each community shall be capable of being assigned read-only or read-write access.

Unit shall support defining 255 changeable (persistent) and 255 volatile messages.

Each message shall support at least 20 pages.

Unit shall support a scheduler with support for up to 255 schedules, 255 day plans and 255 day plan entries.

Unit shall support at least 255 graphics via the monochrome 1 bit graphics scheme.

Unit shall support at least 100 user-defined fonts in addition to the standard font set provided by the manufacturer.

5.3.19 Web-Interface (Smart-Phone Control): Control console shall function as a Web-Server which enables an operator (via user name and password access) through any standard Web-Browser to:

- Create a unique Web-Name for the unit for browser ID
- View the current status of the unit to include current message displayed on sign panel, battery voltage, photocell reading, date & time, and NTCIP control status
- Blank the unit's sign panel
- Select, preview, edit and activate any message from the unit's message library
- Create, edit, preview and activate a new multi-page text message (up to 6 pages)
- Turn NTCIP control on/off if NTCIP control is enabled on control console

Access to the Web-Server shall be though any standard web browser over a standard network connection and/or public IP address (i.e. IP addressable modem). Access shall be protected by a user name and password created by the operator through the manufacturer's proprietary remote control software to ensure security is maintained at all times. The Web-Server shall be capable of being controlled (i.e. turned on and off) via manufacturer's proprietary remote control software. Web-Access to the control console shall not require access to a central server. All access to the Web-Server shall be logged and recorded.

6. Power System

6.1 General

6.1.1 Operating Voltage - 12 Volts DC nominal

6.1.2 Operating Energy Requirement - 75 Amp Hours per day nominal at Spring or Fall Equinox (i.e. 12 hours of daylight, 12 hours of darkness)

6.1.3 Main Power Switch - Main power switch shall be a combination switch and electromagnetic, thermal circuit breaker to provide compete electrical system protection without the inconvenience of conventional fuses. Main power switch shall be splash proof and weather resistant.

6.2 Battery Bank

6.2.1 Number of batteries: Specify four (4), eight (8), or twelve (12)

6.2.2 Battery type: 6-Volt, heavy duty, deep cycle - Specify Flooded Lead-Acid or Gel-Cell

6.2.3 Energy capacity - 1,600 Amp Hours nominal (12 batteries). Sufficient energy capacity to operate the message sign, displaying typical three-line normal size character messages for 21 days, without any energy input from the solar array.

6.2.4 Battery / Equipment Compartments

6.2.4.1 Battery / Equipment Compartments shall be constructed of molded HMWPE (High Molecular Weight Polyethylene), color impregnated with Federal Safety Orange with 0.5% UV stabilizer added to prevent fading.

6.2.4.2 Compartments shall be designed to completely contain spills from a failed or damaged battery case.

6.2.4.3 Compartments shall be capable of supporting an operator standing on top of the battery / equipment compartment to service unit.

6.2.4.4 Compartments shall be designed such that the lid automatically latches in the closed position and holds the batteries in place. Lid shall be capable of being locked in the closed position with a standard padlock.

6.2.4.5 Lid shall be secured to compartment by an integral plastic hinge that permits the lid to be completely removed from the compartment for service. Lid on the compartment containing the control console shall be automatically supported in the open position by a telescoping lid support.
6.2.4.6 Compartments shall be designed to provide adequate ventilation for the batteries during charging yet prevent the ingress of water during use or transport.

6.2.4.7 Each compartments shall be capable of housing four (4) BCI Group GC-2 batteries.

6.3 Solar Array

6.3.1 Photovoltaic module type - Single crystal (monocrystalline) silicon

6.3.2 Number of solar cells per module - 36

6.3.3 Solar array power output: Specify 150, 225, 300, 375 or 450 Watts peak

NOTE: Solar energy system performance charts are available to assist in selection of appropriate solar array power output requirements.

6.3.4 Solar array shall tilt down for fast, easy cleaning and maintenance

6.3.5 Solar array energy output shall be sufficient to operate the changeable message sign, under normal operating conditions, with the solar array in a flat, horizontal position. It shall not be necessary

to tilt or rotate the solar array to provide sufficient energy output from the solar array to operate the message sign continuously. (Note: An optional automatically operated linear actuator may be provided to provide for automatic removal of snow and/or ice from solar array for units specified for extreme climates.)

6.3.6 Photovoltaic module junction boxes shall be equipped with watertight strain reliefs at all cable entry points.

6.4 Wiring and Cabling

6.4.1 All power and control wiring and cables shall be in nonmetallic, flexible, liquid tight conduits.

6.4.2 All conduit fittings shall be sealed at bulkheads or enclosure entry points.

6.4.3 All wiring shall be marine grade, multi-strand, tin-plated copper with PVC insulation rated for outdoor use.

6.4.4 All power system wire terminals shall be tin-plated copper to minimize the effects of galvanic corrosion.

6.4.5 Main power wiring shall be 8 AWG minimum.

6.4.6 Battery terminations shall consist of 5/16-18 UNC marine stud with stainless steel split lock washer and hex nut with 5/16 tin-plated copper ring terminal.

6.4.7 Solar panel terminations shall consist of stainless steel screws with #8 tin-plated copper snap spade terminal.

6.4.8 All other terminations shall consist of locking-type quick-disconnect connectors with tin-plated terminals for power connections and gold-plated terminals for signal connections. Terminal strips, screw or compression type, shall not be permitted

6.5 Energy Management System

6.5.1 Solar energy management system control unit shall include a completely solid state charge controller capable of operating in an outdoor environment. No mechanical or electromechanical switching to control charging current is permitted.

6.5.2 All wiring connections to the energy management system control unit shall be made with locking-type multi-pin connectors to facility quick, easy servicing of the control unit without the need of any tools. Electrical connections shall include an auxiliary 12-Volt power connection to provide power for accessory devices.

6.5.3 Energy management system control unit shall monitor solar array voltage, solar array current, battery voltage, battery current and ambient temperature.

6.5.4 Energy management system control unit shall regulate energy flow from the solar array into the battery bank based on ambient temperature so as to avoid over charging of the batteries and minimize the consumption of electrolyte.

6.5.5 Energy management system control unit shall provide for the controlled periodic pulsing of the solar array current to assist in minimizing sulfate deposit buildup on the battery plates.

6.5.6 Energy management system control unit shall provide for remote monitoring of the battery bank voltage, at the terminals of one of the batteries, to assist in optimizing the transfer of power into the battery bank.

6.5.7 Energy management system control unit shall be equipped with a 2-line by 16-character LCD (Liquid Crystal Display) displaying sequentially, solar array voltage, solar array current, battery voltage, and battery current. In addition, the energy management system control unit shall display a low battery voltage warning message whenever the battery bank voltage drops below 10.9 Volts.

6.5.8 Energy management system control unit shall automatically switch current to the message sign off whenever the battery bank voltage drops below 10.7 Volts to prevent damage to the battery bank due to over-discharging the batteries.

6.5.9 Energy management system control unit shall provide for automatic reverse polarity protection, including reverse polarity indicator lamps, for the solar array and the battery bank.

6.5.10 Energy management system control unit shall provide for automatic fault protection without the need for fuses. The use of fuses for fault protection shall not be permitted.

7. Documentation

7.1 Operation and Maintenance Manual

7.1.1 Setup and Operation

7.1.2 Programming

7.1.3 Maintenance

7.1.4 Troubleshooting and Repair

7.1.5 Assembly Diagrams and Parts Lists

7.1.6 Specifications

7.1.7 Appendix

7.2 Control Center 3000 for Windows - Users Manual

7.2.1 Installation and Setup

7.2.2 Control Center Operation

7.2.3 Appendix

7.3 User Guide

7.3.1 Pre-transport checklist.

7.3.2 Job site setup checklist.

7.3.3 Basic programming instructions.

7.3.4 Basic system status evaluation.

7.3.5 Weatherproof card attached to unit with nylon-coated stainless steel lanyard.

7.4 Integration Support Documentation

7.4.1 Proprietary Protocol Documentation for Custom System Integrators

7.4.2 NTCIP Support Documentation for NTCIP System Integrators

7.4.3 Web-Server Protocol Documentation for Web Based Application System Integrators

8. Maintenance

8.1 Scheduled Maintenance

8.1.1 Solar Array - Clean with water and mild detergent as needed.

8.1.2 Battery Bank - Check electrolyte level once each month and add distilled water as needed. (Note: Not required with Gel-Cell batteries.)

8.2 Preventive Maintenance

8.2.1 Inspect and lubricate axle hubs once per year.

9. Warranty

9.1 Standard Warranty

9.1.1 Bumper to Bumper - Full warranty five (5) years - consult factory for terms & conditions

9.1.2 Solar Panels - Ten years

9.2 Extended Warranty - Consult factory

10. Options

10.1 Battery Charger

10.1.1 Charger type - Switching regulator, constant voltage with automatic switch to maintenance or trickle charge.

10.1.2 Input Voltage - 110 VAC 50/60 Hz (specify 220 VAC 50 Hz for international use)

10.1.3 Available models with typical recharge times.

10.1.3.1 30-Amp - 54 hours (12 batteries), 36 hours (8 batteries), 18 hours (4 batteries)

10.1.3.2 45-Amp - 36 hours (12 batteries), 24 hours (8 batteries), 12 hours (4 batteries)

10.1.3.3 75-Amp - 22 hours (12 batteries), 16 hours (8 batteries), 8 hours (4 batteries)

10.1.4 Battery charger unit shall install in the field with minimum effort.

10.2 Remote Control

10.2.1 General

10.2.1.1 The remote control option shall provide for complete control of all dynamic message sign functions. The remote control option shall, at a minimum, provide for:

- Operating and maintaining a minimum of 100 remotely located message signs
- Sending a message to a remote PCMS for immediate display
- Receiving the message currently displayed on a remote PCMS
- Managing the message libraries and message schedules & events on a remote PCMS
- Checking the operating status, including sign panel status, system date & time, battery voltage, estimated automony, temperature, unit Up-Time, Current Run-Time, Life-Time Run-Time, and ambient light level of a remote PCMS
- Managing the control console's Web-Server and NTCIP status
- Retrieve up to 30 days worth of logged Radar Statistics from units equipped with optional Radar Speed Monitor (see section 10.3 for optional Radar Speed Monitor)
- Provide for the ability to perform various system resets including a complete re-boot/restart of the system

10.2.1.3 Communication Protocol - Proprietary with complete CRC error detection and correction and full challenge-response password authentication.

10.2.1.4 Data Format - Data is encrypted and compressed for added security and reliability.

10.2.1.5 All operating software for message sign control console and host computer shall be included with basic message sign package.

10.2.1.6 Remote control system shall install in the field with minimum effort.

10.2.2 Telephone Land Line Operation

10.2.2.1 Data rate - Selectable from 1200 to 9600 bps.

10.2.2.2 MNP 2-4 Error Control - Automatic error detection and correction.

10.2.2.3 MNP 5 Data Compression - Higher data rates, shorter connection times.

10.2.3 Digital Dial-Up Cellular Transceiver Operation

10.2.3.1 Data rate - Selectable from 1200 to 9600 bps.

10.2.3.2 Wireless modem with full 3-Watt cellular transceiver.

10.2.3.3 MNP 2-4 Error Control - Automatic error detection and correction.

10.2.3.4 MNP 5 Data Compression - Higher data rates, shorter connection times.

10.2.3.5 MNP 10EC - Enhanced performance over noisy cellular connections.

10.2.4 TCP/IP Network Communications (Dynamic or Static IP Address)

10.2.4.1 Data rate - 10/100 Base-T Ethernet

10.2.4.2 Remote control of any networked (IP addressable) PCMS may be achieved from any host computer with internet connectivity (either with standard NTCIP commands via SNMP or STMP, or with Control Center 3000). Remote control software (Control Center 3000) shall be provided free of charge with unit and function on any host computer, independent of operating system. Control console and remote control software shall incorporate a challenge/response encrypted type password security system to prevent unauthorized access of any networked PCMS.

10.2.5 IP Addressable Cellular Transceiver Operation

10.2.3.1 Wireless modem with up to a 3-Watt cellular transceiver.

10.2.3.2 MNP 2-4 Error Control - Automatic error detection and correction.

10.2.3.3 MNP 5 Data Compression - Higher data rates, shorter connection times.

10.2.3.4 MNP 10EC - Enhanced performance over noisy cellular connections.

10.3 Radar Speed Monitor

10.3.1 General

10.3.1.1 Operating Frequency - 24.15 GHz (K-Band)

10.3.1.2 Antenna Beamwidth - 12° (Circular Pattern)

10.3.1.3 Capture Angle - 16.5° typical (Circular Pattern)

10.3.1.4 Target Speed Range - 5 to 125 MPH (20 to 200 km/h)

10.3.1.5 Target Speed Accuracy - 1 MPH typical

10.3.1.6 Detection Distance - 1,500 Feet (Automobile-size target)

10.3.1.7 Radar unit shall install in the field with minimum effort.

10.3.1.8 Message sign shall be pre-wired and pre-programmed for radar speed monitor option.

10.3.2 Operating Features

10.3.2.1 Target Speed Display - The speed of the target may be displayed as part of any user-created messages, in any character size, in any position in the message. Multiple messages which include target speed can be stored in the message library.

10.3.2.2 Triggered Display - A message may be displayed only when an acquired target exceeds a preset speed threshold. This message may include the display of the target speed. If no target is acquired or if the acquired target is below the preset threshold, the default message will be displayed. Default message can be a blank display.

10.3.2.3 Window Triggered Display - Upper and lower speed thresholds may be preset such that the special message is displayed only when the target speed is above the lower threshold but below the upper threshold. This message can include the display of the target speed. If no target is acquired or if the acquired target is above or below the preset thresholds, the default message will be displayed. Default message can be a blank display. Multiple windows can be programmed each with a different message to be displayed when the acquired target speed is above the minimum speed but below the maximum speed threshold for that particular window. Each of these messages can include the display of the target speed.

10.3.2.4 All necessary software features shall be included with the basic message sign package.

10.3.3 Radar Statistical Data Collection

10.3.3.1 Control Console shall automatically log and record (to a standard USB memory stick) all raw data provided by the radar gun along with basic statistical information about the collected data in 15 minute intervals. The data shall be stored in two CSV (Comma Separated Value) files which may be opened in Microsoft Excel or any other similar spreadsheet type application for viewing, manipulation and analysis. Additionally, the most recent 30 days worth of Radar Statistics (statistical radar data logged every 15 minutes) shall be maintained in the control consoles non-volatile memory and shall be retrieved remotely via Control Center 3000 - see Control Center 3000 manual for further details.

10.3.3.2 Data Provided

10.3.3.2.1 Raw Data File: (radar_data file) - (Year, Month, Day, Time, Reading) - every reading - readings recorded every 250ms while tracking a target

10.3.3.2.2 Statistical Data File: (radar_statistics file) - (Year, Month, Day, Time, # of Readings, Mean, Median, Mode, Standard Deviation, Lowest Reading, Highest Reading) - based on all readings - readings are taken every 250ms while tracking a target

10.4 GPS Receiver

10.4.1 General

10.4.1.1 Operating Voltage: 8-33 Vdc

10.4.1.2 Input Current: 40 mA @ 12 Vdc maximum

10.4.1.3 Receiver Sensitivity: -185 dBW minimum WAAS Enabled

10.4.1.4 Operating Temperature Range: -22F to +176F (-30C to +80C)

10.4.1.5 Acquisition Time: Cold - 45 seconds maximum

10.4.1.6 Update Rate: 1 record per second

10.4.1.7 Accuracy: < 3 meters

10.5 Sign Panel Flux-Gate Digital Compass

10.5.1 General

10.5.1.1 Operating Voltage: 8-28 Vdc

10.5.1.2 Input Current: 40 mA @ 12 Vdc maximum

10.5.1.3 Operating Temperature Range: -40C to +65C (-40F to +150F)

10.5.1.4 Shock/Vibration: meets MIL-STD-810 requirements

10.5.1.5 Altutide: 40,000 ft. maximum

10.5.1.6 Reliability: MTBF > 30,000 hours

10.5.1.7 Accuracy: +/-0.5 degrees

10.5.1.8 Repeatability: +/-0.2 degrees

10.5.1.9 Resolution: 0.1 degrees

10.5.1.10 Dip Angle: +/-80 degrees

10.5.1.11 Tilt Angle: +/-16 degrees

10.5.1.12 Response Time: 1 second